Price Analysis in Agriculture

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ABSTRACT: Product prices, price ratios, price changes, and the factors on which prices depend are among the most important issues in marketing agricultural products. Prices of agricultural products determine the income levels of producers, affect consumer spending on food, and the profits and export earnings of agricultural marketers and speculators. Because of their impact on economic growth and development, governments are developing comprehensive policies and programs to regulate domestic and foreign prices for agricultural products. Since agricultural product prices have a great impact on the incomes of producers and intermediaries, the content of the policies and programs developed is very important. This study discusses the reasons for selling the same agricultural product at different prices in different markets, price analysis, quality-related price changes, and the impact of government programs on price. The explanations begin with the definition of the market, followed by the formation of the equilibrium price under current supply and demand conditions. After examining the seasonal changes in supply and demand conditions on prices, the effect of inventory costs on prices, and price fluctuations, a simple two-zone trade model is used to explain how interregional price differences occur using supply and demand functions. The standardization of products and the benefits of sorting for consumers, the relationship between product quality and price, hedonic prices are among the topics highlighted. At the end of the study, the role of government programs in solving price problems is also discussed.

Keywords: Price, Fluctuation, Supply, Demand, Market

Tarımda Fiyat Analizi

ÖZET: Ürün fiyatları, fiyat oranları, fiyat değişiklikleri ve fiyatların bağlı olduğu faktörler tarım ürünleri pazarlamasının en önemli konuları arasındadır. Tarım ürünlerinin fiyatları; üreticilerin gelir seviyesini belirler, tüketicilerin gıda maddeleri harcamalarını, tarım ürünlerini pazarlayanların ve spekülatörlerin kârlarını ve ihracat gelirlerini etkiler. Ekonomik büyüme ve gelişmeye etkisinden dolayı hükümetler, tarım ürünlerinin iç ve dış fiyatlarını düzenleyici kapsamlı politika ve programlar üretirler. Tarım ürünlerinin fiyatları, üretici ve aracıların gelirleri üzerinde çok etkili olduğundan, hazırlanan politika ve programların içeriği çok önemlidir. Bu araştırmada, aynı tarım ürününün farklı pazarlarda, farklı fiyatlarla satılmasının sebepleri ve fiyat analizleri ile kaliteye bağlı fiyat değişmeleri ve hükümet programlarının fiyat üzerindeki etkileri üzerinde durulacaktır. Açıklamalara Pazar tanımı ile başlanacak, mevcut arz ve talep şartları altında denge fiyatının oluşması bunu izleyecektir. Arz ve talep şartlarının mevsimlere bağlı olarak değişmesinin fiyatlara yansıması, depolama masraflarının fiyatlara etkisi ve fiyat dalgalanmaları incelendikten sonra iki bölgeli basit bir ticaret modeli yardımı ile arz ve talep fonksiyonları kullanılarak bölgeler arası fiyat farklarının nasıl oluştuğu açıklanacaktır. Ürünlerin standardizasyonu ve derecelendirmenin tüketicilere sağlayacağı yararlar, ürün kalitesi ve fiyat arasındaki ilişki, hedonik fiyatlar üzerinde durulan konular arasındadır. Araştırmanın sonunda, fiyata ilişkin problemlerin çözümünde hükümet programlarının rolü üzerinde de durulacaktır.

Anahtar Kelimeler: Fiyat, Dalgalanma, Arz, Talep, Piyasa

INTRODUCTION

Price volatility of agricultural products is a situation that can be constantly challenged. Policy makers and all stakeholders in the food supply chain are interested in better understanding the possible causes of agricultural price volatility and likely future trends. For example, farmers in many countries face multiple risks that have been mitigated to some extent in the past through market and price support measures (Matthews, 2010). The OECD (2009) notes that agriculture is exposed to many risk factors, including production, market, institutional, human resource, and financial risks. Foremost among these risk factors is market risk, which is the uncertainty about the prices producers will receive when selling products or paying for inputs (OECD, 2011). Many studies have discussed the factors that can explain the evolution of recent price changes worldwide (Abbott and Borot de Battisti, 2009; Gilbert, 2010; Gilbert and Morgan, 2010). Most of these factors involve changes in supply/demand factors. On the demand side, the rapid economic development in Asian economies and especially in China is highlighted. On the supply side, in addition to the decline in the production of agricultural products in recent years, insufficient investment in agriculture is also seen as contributing factors. In addition, with the increasing production of biodiesel, a form of modified food use has emerged as a new factor. Other than specific product market principles, other macroeconomic and financial factors are believed to influence the volatility of agricultural product markets. These include: Changes in fuel prices, changes in the global money supply, and changes in the value of the dollar. This is because most prices for agricultural products are priced in United States (US) dollars. Among other factors, there are feedbacks between climate change, trade policies of exporting and importing countries, price expectations, and market responses (OECD, 2011). Gilbert and Morgan (2010) and De Schutter (2010) emphasized the role of futures speculation and preferential trading in food markets, while some other authors disagree with this view (Irwin and Sanders, 2010). These actions can have important implications for resource allocation and consumer and producer welfare. First, volatility at the macroeconomic level can have significant negative effects on growth and poverty, which is particularly harmful in poor countries (Aizenman and Marion, 1993; Ramey and Ramey, 1995; Rodrick, 1999). Some economists have found that there are important links between volatility and crises and that higher volatility can lead to economic crises (Aizenman and Pinto, 2005; Acemoglu et al., 2003). To better manage this

phenomenon, it is important to know the evolution of price volatility in order to help market participants and design appropriate policies. Some studies have focused on how to help producers mitigate the risk of price volatility and better address income stagnation. These publications focus on some market-based tools to spread risk or at least mitigate increasing price volatility in the world market. Galtier (2009), for example, focused on dealing with food price instability in developing countries. Second, price volatility of agricultural commodities can affect the decisions of households, producers, and governments. Price risk is one of the most important components of risk facing rural households, not only in developing countries. Many countries rely on export revenues from products as a source of income (Dehn et al., 2005). Some authors have made efforts to measure the variability of agricultural prices. Gilbert (2006) found that agricultural price volatility was low in the 1960s, but higher in the 1970s, and stable at 1960s levels in the second half of the 1980s and 1990s. Gilbert and Morgan (2010) examined 19 products over the period 1970-2009 and concluded that volatility was lower in the last two decades than in previous periods, except for rice. Balcombe (2009) finds a continuous fluctuation in agricultural price series. In contrast, Sumner (2009), who examined wheat and corn price data for the period 1866-2008, found that prices exceeded those of the postwar period only between 2006-2008. However, it is noted that the results of these studies are often influenced by many specific criteria depending on many factors such as the volatility measure used, the number of price observations analyzed, and the selection of the study period (OECD, 2011). In our country, important studies have been conducted to determine price volatility and show its impact. For example, Taşdan (2005) emphasized that increasing the production and use of biofuels in Turkey can reduce the cost of oil imports, achieve higher value added from agricultural products, and create additional jobs. When Özertan (2007) examined the energy situation in Turkey, Özertan (2007) examined the energy situation in Turkey, he determined that 37% petroleum, 27% coal, 23% natural gas, 5% hydroelectricity and 7% other renewable resources were used as energy consumption on product basis in 2004. Of these amounts, Turkey imports 95% of the crude oil, 98% of the natural gas and 47% of the coal it uses. With these approaches, it has been stated that the use of biofuels has started to become an alternative as an energy source over time. However, in the same study, it was emphasized that the optimal distribution of food security, agricultural product prices, water and land resources between food and energy should be made. Ar

(2008) evaluated biofuel production and developments, possible threats and opportunities for our country within a broad concept. It is stated that there are more than 100 biodiesel plants in Turkey and their installed capacities are around 1.5 million tons. In the case of regular and planned production, where biofuel production does not have a high impact on the increasing food prices as claimed, on the contrary, it is an indispensable tool for sustainable agricultural production and the welfare of producers is claimed to be used. Ozkan et al. (2003) examined the prices received by producers for orange, lemon and mandarin in Turkey for the period 1982-1998. In addition, seasonal fluctuations in wholesale prices of The market of oranges and lemons in Antalya province in the period 1994-2001 was analyzed and the marketing margins were calculated. According to the results of the research, it was found that the prices of oranges, lemons and tangerines increased by 6.37%, 64.50% and 15.01%, respectively, in the studied period. The marketing margin calculations revealed that the marketing margins of oranges and lemons fluctuated significantly. Erdal et al. (2008) empirically investigated the relationship between agricultural and food price uncertainty and inflation in Turkey. In the study, GARCH models were used to obtain the uncertainty series for agricultural and food prices. Johansen cointegration and impulse response analyzes were used to determine the long-run relationship between the series. According to the results of the analysis, it was found that there is a long-run relationship between uncertainty of agricultural and food prices and inflation in Turkey and that uncertainty in agricultural and food prices has a positive effect on inflation. Kıymaz (2008) used the ATPSM of Agricultural Trade Policy Simulation Model, which is a world agricultural trade model. He studied the impact of liberalization on Turkish agriculture under different scenarios. Cereals, sugar, and dairy products were selected for impact analysis. It is expected that as the degree of liberalization increases, the domestic prices of the selected products in Turkey will decrease and the overall welfare level of the sector will increase to some extent, highlighting the significant welfare loss of producers. Mutlu et al. (2008) They investigated the relationships between the retail prices of some fresh fruits and vegetables in Adana, Mersin and Antalya, which are important producers in the fresh fruits and vegetables sector in Turkey, and Istanbul, Ankara and Izmir, which are important consumption centers, and whether there is market integration between the provinces in terms of the prices in question. They tested it with the methods of regression (VAR) and dynamic analysis of market integration. As a result, the model

VAR for the lemon market showed that Adana is the leading market, while the lemon prices in the other provinces move depending on the prices in Adana, the leading market. Bakırcı (2009) used the predictions of the spider web theorem to investigate how fluctuations in agricultural commodity prices affect the decision on the size of cultivated land and thus the production decision. It has been shown that producers generally do not take into account the previous year's prices by planting out of necessity, since they cannot plant alternative crops when making production decisions for products such as potatoes, onions, garlic, and eggplants. Orman et al (2010) analyzed the reasons for the relatively high volatility of fruitand vegetable prices in our country and divided them into two groups. These: (1) possible differences in the calculation method of price indices, (2) structural reasons affecting price formation. Polat (2010) investigated the relationships between the supply quantities of some important fresh fruits and vegetables and the price formation in the wholesale market in Adana in 2008. As a result of the investigation, it was found that the increase in the production quantity of product lowers unit price. Gunduz et al. (2011) found that apricot yield varies significantly due to climatic factors in the Malatya region. Taşdemir and Taşdan (2011) used the prices of wheat, corn, lemons, tomatoes, apples, milk, and beef carcasses for the period 2003-2010 to show the effects of seasonal variation on prices using seasonal indices and coefficients of variation.

There are many market definitions, from the simplest to the most detailed. The market as the sum of current and potential (future) buyers and sellers of a particular good or service. In this definition, the community that constitutes the market has two characteristics: (i) none of the buyers can buy that good from sellers outside the community; (ii) none of the sellers may sell that good to buyers outside the community. Relationships between sellers and buyers; A set of prices leads to buying and selling conditions. Houck's definition shows how to infer market demand from individual demand. Market demand, which is the sum of demand from individuals in a market, shows the total quantity of the product that consumers want to buy at various prices, holding other conditions constant. The horizontal sum of demand from individuals in the market is shown. When the price is at the level of P1, consumers buy $q_1 + q_2 + q_3 = Q_t$ products. Although the number of consumers in the market is much larger than in this example, the style of calculation is the same. Other points on the market demand curve are determined in the same way. If you pay attention to the shape, you will see an important feature of market demand: The shape of market

demand depends on the number of consumers in the market. As the number of consumers in the market increases, the curve shifts to the right (the slope of the curve decreases). While the shape of each of the demand curves in the market depends on the price (P), the equation of the market demand curve should be assumed to be the dependent variable (Q) and written accordingly. The market supply curve is derived in the same way as the market demand curve. The market supply curve of a product consists of the horizontal sum of the supply curves of the firms producing that product. The market supply curve shows the total quantity of products that producers will offer at different prices if all other things remain constant.

In the short run, it is sufficient to draw the market supply and demand curves on a diagram to see how prices are formed in a market with perfect competition. There is only one price level at which the production level of firms matches the demand of consumers. This price is called the equilibrium price (Pd) and the quantity of the product offered at this price in the market is called the equilibrium quantity (Qd). Once the equilibrium price is set, it remains in place until conditions change. When conditions change, the equilibrium is disturbed and movements toward the new equilibrium begin. Prices other than the equilibrium price cannot be sustained for long in a competitive market; the emerging market conditions force prices to move toward equilibrium. For example, at a price level above the equilibrium price (P1), producers are willing to supply the market with up to Qa. At the same price level, consumers demand less (Qt). As can be seen in this example, oversupply occurs in the market when the price level is above the equilibrium price. At price levels higher than P1, there is greater excess supply. As a result, the oversupply in the market causes sellers to lower their prices. At this price level, the quantity of product demanded is Q1 and the quantity of product offered is Qa. Shortage of supply (Q1-Qa) in the market will lead to higher prices. In perfectly competitive markets, at higher than equilibrium production levels (like Q1 in the example above), the marginal cost incurred by the business is greater than the price consumers are willing to pay. This situation will result in the production cuts of the enterprises. As seen in these examples, movements in the direction of equilibrium include both price and quantity changes. It should not be thought that market equilibria will occur immediately. Learning prices, accessing information about products Processes such as reaching an agreement in terms of shopping and quality control tests delay the formation of market balance.

MATERIAL and METHODS

Since the article is a compilation, the research topic and the method of the research were determined by examining the relevant domestic and foreign literature, internet documents, scientific books, national and international periodicals, and the content of the theoretical part of the article was tried to be created by continuing the literature review. By working on the hypotheses of the study, the hypotheses were tried to be determined.

RESULTS and DISCUSSION

Price formation under inelastic supply and demand conditions

Demand for food is inelastic at the firm level. Although demand for food in developed countries increases as a function of income and population growth, this increase is not as high as for manufactured products. In these countries, population growth and the parallel increase in demand for food are almost equal. In other words: If the population increases by 1%, the demand for food can be expected to increase by 1%. The same is not true if income increases. The income elasticity of food is about 0.2-0.3. In other words, if income increases by 10%, demand for food increases by 2-3%. This is because the digestive capacity of the human stomach is limited. Given the increase in income, food consumption is generally not expected to increase much, but the opposite may be true for some products. Depending on the increase in income, demand can be expected to increase significantly, especially for expensive products that meet the need for a balanced diet and have a high quality of service. In the short term, the supply of each or all food products is inelastic. Due to the biological structure of the cultivation of agricultural products, there is a long time span (4 months or more for some products, 6-7 years for some products), but it varies from product to product between production and consumption dates. Producers' planned production volume is the amount of land they plan to produce multiplied by the yield they expect from the land unit. As the harvest season approaches, it becomes clearer how much variation there will be from the estimated production volume as yield changes. However, it is not possible to change the production plan until the next production period. Therefore, the estimated income may not be achieved or a favorable price may be found, rices based on 1994=100 and 2003=100 were used to make current prices real (PPI)the price can be much higher than that. It takes months or even years for farmers to keep up with price changes in the market. In this regard, it is normal for farm prices to remain high or low for years. For annual products, it is relatively easy to profit from

increased prices. However, for perennial products (such as fruits, citrus, nuts, poultry, livestock, etc.), it is more difficult to change the production plan according to price trends. In addition, yields can vary widely from region to region due to climate changes, diseases, and pests. In the short term, the effect of the inelasticity of supply and demand of agricultural products on prices can be illustrated by drawing. Due to favorable climatic conditions, the actual production level (A2) is higher than the expected production level (A1). Although the production difference is small, the price drops significantly due to the inelasticity of demand. (Note that the price decline is smaller when the supply curve is more elastic, i.e., sloped.) In the years when climatic conditions are favorable, it often happens that the yield of agricultural products increases and, on the contrary, production decreases. Changes in the demand for agricultural products, on the contrary, are not common, but rather rare. In the short run, a decrease in demand (from T1 to T2) leads to a decrease in product prices (from P1 to P2). For example, against the substance Alar used in apple production in the U.S. Price T A1 A2 Price T2 T1 A P1 P1 P2 P2 Quantity Quantity Q1 Q2 Q (a) (b) The effect of inelastic supply and inelastic demand on prices Agricultural marketing has found that public consumption of apples and apple juice has declined sharply. The impact has been so great that the government has purchased large quantities of apples to avoid the loss of apple producers. The impact of public preferences in this direction on the increase in demand for some products has also been large. For example, in a program of TV in the United States, it was found that despite the high consumption of animal fat in France, the incidence of heart disease in that country was very low. The fact that wine consumption is associated with wine consumption led to an explosion in wine consumption and an increase in wine prices in the U.S. (Padberg, 1998). As a result of globalization, the factors that affect price in one country have begun to participate in events in other countries. The frost in Florida affects citrus prices in Brazil. The increase in hazelnut production in Turkey affects almond prices in the United States. A drought in Australia affects wheat prices in the U.S. and Canada, and a frost in Brazil affects world coffee prices. Similarly, one country's agricultural policies affect demand and prices for agricultural products in other countries.

Relationship between prices

Marketing; It is also defined as increasing the benefits of the products by changing the shape, consumption time, location and ownership of the products. The shape benefit increases with the processing of the products, and the time benefit

increases with the storage. Place benefits increase when products are moved from places where they are abundant to places where they are not available at all or where they are scarce, and property benefits increase when they change hands. As a result of these different transactions, the price relations of the products in the competitive environment are explained by the single price law (TFY) (Nicholson, 1998). The law of one price, a product in a perfectly competitive market; It means that the price is the same when the processing, storage and transportation costs are taken into account. In legal applications, the price differences and transportation costs of the products in different geographies are generally emphasized. One of the things to consider in the analysis of agricultural product prices is what price is meant. The prices of agricultural products are separately based on the marketing channel (farm, enterprise, wholesaler, retailer) and period (daily, weekly, monthly, annual or production period). While analyzing, it is necessary to pay attention to which price will be used. Marketing; It is also defined as increasing the benefits of products by changing their shape, consumption time, location and ownership. The shape benefit increases with the processing of the products, and the time benefit increases with the storage. Place benefits increase when products are moved from places where they are abundant to places where they are not available at all or where they are scarce, and property benefits increase when they change hands. As a result of these different transactions, the price relations of the products in the competitive environment are explained by the single price law (TFY) (Nicholson, 1998). The law of one price, a product in a perfectly competitive market; Consider the processing, storage and shipping costs. It means that the price is the same. In applications related to the law, the price differences and transportation costs of the products in different geographies are generally emphasized. One of the things to consider in the analysis of agricultural product prices is what price is meant. The prices of agricultural products are separately based on the marketing channel (farm, enterprise, wholesaler, retailer) and period (daily, weekly, monthly, annual or production period). While analyzing, it is necessary to pay attention to which price to use.

Product Prices Based on Time Individuals and institutions involved in the marketing of agricultural products and foodstuffs are closely concerned with the fluctuation of product prices over time. Producers and intermediaries in the marketing channel; They have to make decisions about production, storage, purchasing and marketing. Businesses that invest in large amounts are called forward sales, which are made by taking into

account the future-oriented purchase and sale strategies (hedging*) of the products they produce. The same process is also used in future purchases.) have to estimate the risks borne by price changes in order to be able to determine them in a healthy way. Those who aim to make a profit in the financial markets or the markets where future transactions are made (futures market) also want to predict prices accurately long in advance. Price changes depending on time can be grouped under four groups: (i) long-term price trends that occur due to supply and demand or macroeconomic variables such as) have to estimate the risks borne by price changes in order to be able to determine them in a healthy way. Those who aim to make a profit in the financial markets or the markets where future transactions are made (futures market) also want to predict prices accurately long in advance. Price changes depending on time can be grouped under four groups: (i) long-term price trends that occur due to supply and demand or macroeconomic variables such as inflation; (ii) seasonal price changes that occur due to seasonal supply and demand and repeat every 12 months; (iii) multi-year price fluctuations due to the economic conjuncture; (iv) year-to-year and irregular price changes. Product price at any time; may occur as a combination of trend, seasonal effect, cyclical effect, or erratic price fluctuations (Padberg et al, 1997)

Seasonal price changes

It is not difficult to predict the price fluctuations in agricultural products caused by the seasonal changes in supply and demand. The harvest period is one, two or three months. During the remainder of the year, the product kept in stock will be consumed. This form of production and sale is typically found in cereals and oilseeds. As a result, prices are low during the harvest season and increase during the rest of the year due to storage costs. Animal product prices; may vary seasonally, depending on biological factors, feed availability and growing techniques. For example, beef prices may decrease with the slaughter of butchery animals in the autumn. Egg production is the highest in the first spring and the prices are the lowest. Milk production is also high in the first spring due to the calving of animals and the more favorable pasture conditions, and the prices are low. Changes in demand depending on the seasons also affect prices. The increase in temperature in summer increases the demand for cold drinks, ice cream, melon, watermelon and lemon. In cold weather, the demand for steak, bacon and sausage increases. During the Eid-al-Adha, the demand for sheep and beef reaches its maximum level. At the beginning of the year, turkey and chicken demands increase. Changes in production systems are also effective on seasonal price changes. Seasonal price variations were less in environments with large-scale and specialized production units and vertical integration between businesses.

Storage

Storage connects the product to the markets throughout the year. Through this connection, storage increases the time utility of consumption. Storage uses resources and it comes at a cost. Costs affect storage decisions and prices. Storage requires many physical facilities (barns, silos, cold stores, tanks). Thus, storage has fixed costs and variable costs. Variable costs of storage vary depending on the storage period, not the product stored; fuel costs, conservation and containment costs (chemicals and others) labor costs, insurance and interest costs.

Price movements Depending on The Conjuncture

Price fluctuations due to the conjuncture occur and repeat in the short term depending on the changes in the economy. Due to the inverse relationship between price and quantity, which arises due to the law of demand, prices are high when production decreases, and prices are low when production increases. Such fluctuations occur in animal products and perennial crops in many countries. The model used to explain cyclical price movements is the Cobweb theorem (Nicholson, 1998). The model starts with three assumptions when explaining cyclical fluctuations in prices and quantities: (i) production decisions are made taking into account current prices; (ii) there is at least 1 year between the production decision and the harvest season; (iii) current price is a function of available supply while current supply depends on current production. Considering the time factor in these assumptions, it is understood that price movements will show successive fluctuations. The current supply is a function of the price a year ago, what is produced that year will be sold that year, current sales determine the current price. Let's write the functions:

Supply: $Q1 = f(P_{t-1})$; or if written in linear model: $Q_t = a + b\,P_{t-1}$ Demand: $P_t = f(Q_t)$; written in linear model: $P_t = c - d\,Q_t$.

Using the linear model, we can show how the cobweb model works. This explains why the price and quantity movements that occur due to supply and demand are likened to a spider web.

Local Prices

The market price is formed as a result of the gathering of buyers and sellers in a geographical location. Different prices may arise in different parts of the market; this is due to shipping costs. At points

where supply and demand conditions affecting prices are similar, prices are expected to move in the same direction.

Geographical Price Relationships

The definition of the competitive market area goes back to Marshall. According to this definition, "The market area of a product is the area where the price is the same when shipping costs are taken into account." A product is produced in region A and sold in region B, and the transportation costs between these two cities are Nab, in a perfectly competitive market* (Perfect competition market; in which many buyers and sellers buy and sell a homogeneous product, buyers and sellers have full knowledge of the market conditions and the product. It is a market where there is free entry and exit to the market, the price is formed without any hindrance depending on supply and demand.) The price of the product is expected to be Pb = Pa = Nab in region B. Equality is an extension of the law of one price in a geographical sense. Looking at the markets around the world; It is rare to find that the price difference is only due to shipping costs. The reasons for this are very diverse. First of all, the shipping cost function is not unique. The shipping costs functions of the sellers are more or less different from each other. Among the reasons for this, we can count the difference in the amount of goods transported from each other, the existence of restoration possibilities and the differences in other transportation conditions. On the other hand, not everyone has a complete and continuous knowledge of the market as in the perfect competition model. For these reasons, there may be significant differences between prices for a certain period of time. After making this reminder, we can continue our analysis of local prices. Tomek and Robinson (1990) attributed the sources of price difference for the same (homogeneous) product in competitive markets to the following principles: (i) the price difference between two regions (or markets) that exchange goods with each other is equal to transportation costs; (ii) the price difference between two regions (or markets) that do not exchange goods with each other may be less than or equal to the shipping costs. The reason why the price difference is not more than the transportation costs in a perfectly competitive market is simple. If this were the case, the sellers would buy the product from the cheap place and sell it where it is expensive. As a result of this shopping, there would be an increase in prices at the point where the prices were low at the beginning, and a decrease in the places where they were high, and this situation would continue until the product transportation became unattractive. Based on these principles, the

theoretical structure of local price differences can be revealed. The price structure is a representation of the shipping costs (and trade pattern) of a unit of goods. is the function. Even in the absence of trade between the two regions, it is possible to determine the price structure. For example, if all regions with surplus production sent their goods to one central market rather than to each other, the price at each point would be the difference between the central market price and transportation costs. In this case, the price differentials between regions with a surplus would be equal to the difference in their transportation costs to the central market. Since the net price received by the producers will be equal to the difference between the central market price and the transportation costs, we can make two determinations. First, the size of the market is a direct function of production costs; second, as the distance to the central market increases, net income and the capitalized (reduced to present value) value of the factors of production decrease. The price structure is more complex when the number of consumption centers is more than one. Under the current demand conditions in the consumption centers, producers would want to send goods to the center that would provide them with the highest net price, and the width of the supply area would vary until the difference between the market price and the transportation costs was equalized. Enterprises that were at the same distance to obtain the same net price in both consumption centers would be located at the border of these two consumption centers. A change in price, or a change in the cost of transportation, in any of the centers would cause the relative prices to change, which would lead to a change in the frontier.

Shipping Costs

In markets where conditions of perfect competition are experienced, transportation means with the lowest transportation costs will be preferred. If the cheapest means of transport is the truck, the truck transportation will determine the market limits. If rail transport is the cheapest, trains will determine the market limits this time. Generally, the cheapness of the means of transport depends on the distance of transport.

Price relations Between Regions

Agricultural products markets are not limited to 2 as seen in the example above, and the relations between the markets are also very complex. In the examples given, shipments were made from surplus locations to one or two markets. In reality, shipments are made from many oversupply points to many markets. Markets are large metropolises and their

environs. In regions with surplus production; Many crops with different climate, soil requirements and relative profitability are grown. For example, in Turkey, cereals are grown in Central Anatolia, legumes in Southeast Anatolia, industrial plants in the Aegean, oilseeds in the Marmara, citrus fruits in the Mediterranean, and hard-shelled fruits in the Black Sea, according to their production intensity in Turkey. Geographical price relations of these complex markets can be analyzed with local equilibrium (spatial equilibrium) or trade models. By using these models, the supply and demand conditions in each market, the transportation costs, the amount of products to be supplied from the production points to the consumption centers and the net prices to be obtained can be calculated according to the minimum cost criterion. The way the trading model works can be illustrated with a simple two-zone example. This example is important as it forms the basis for more complex models. In our example, let's assume that both regions produce and consume the same product. Supply and demand functions of this product in the regions are shown below. Demand in region A in region B: $PA = 12 - QtA$; $PB = 20 - QtB$ Supply: $PA = QaA$; $PB = 4 = QaB$ In the equations, Qt represents the quantity demanded, Qa the quantity supplied, and regions A and B. Pa is the price of the product in region A; Pb shows the price of the product in region B. QtA and QtB show product demands in regions A and B. If there was no trade between the two markets, product prices would be independent of each other, depending on the supply and demand conditions in the regions. would change. In the absence of commercial activity, the equilibrium prices and quantities of the products in the regions are found by equalizing the supply and demand. Let's include business activity in the model. Let's not consider shipping costs first. If shipping costs are not taken into account, the excess supply in a region will be the difference between the quantities supplied and demanded at each price level:

$$AUC = QaA - QtA$$

At equilibrium, the excess supply is zero (EA=0). Oversupply can happen in any region. Likewise, excess demand is the portion of quantity demanded in excess of quantity supplied at each price level:

$$ETB = QtB - QaB$$

At equilibrium, excess demand is zero (ETB=0). At price levels lower than the equilibrium price, the excess demand is equal to the difference between the demand and supply quantities. In order to show the excess supply and demand depending on the price, the supply and demand functions must be reconstructed by taking the quantity as the dependent variable.

The trade model reflects the essence of geographic price relationships; The difference in price between the two regions trading with each other is equal to the shipping costs. The price difference between the two non-trading regions is equal to or less than the shipping costs. While stating these, we assume that the product is homogeneous, that the prices and quantities are known, that there is a perfectly competitive market and that there is freedom of trade. Considering that these assumptions are not generally valid in the world, the reasons for encountering regions where there is no exchange of goods between them even though the price difference is more than the transportation costs, or the price applications that are much higher than the transportation costs, are understandable.

Application of the trading model

Although the bi-zonal trade model is an oversimplified version of the real world, it provides insight into the effects of changes in supply, demand and transportation costs on prices, production, consumption and trade. The model allows us to monitor the impact of a change in demand in one of the regions. Through the model, the effects of customs barriers between countries or changes in exchange rates can also be examined.

The simple two-zone model is actually not sufficient to explain the complex problems experienced in the production and consumption regions. For example, let's consider each of the big cities in Europe as a consumption center, and every point where there is a surplus of agricultural production is an export port. There is a supply function for every port, and a demand function for every consumption centre. What is expected to be solved economically here is to find the equilibrium production quantities and prices to be produced at the production points and sent to the consumption points. Even in the most developed market conditions, it is not possible to provide sufficient information to solve the problem. The thing to do is to determine the geographical regions, to determine a small number of supply and demand points in each region, and to interpret the supply and demand functions at the determined points by estimating the transportation costs.

Product Standards

Although the products are considered homogeneous, they carry very important differences in terms of the consumer. Sellers allow manufacturers to easily distinguish the products they want. They group products according to similar characteristics in order to increase their sales by providing as a result of grading the products according to plant nutrients, size,

weight and other characteristics, heterogeneous structures are divided into homogeneous structures. These developed standards are considered equal to quality, different standards mean different quality. As a result, product standards ensure that information exchange between producers and consumers is more accurate and comfortable. The development of degrees and standards depends on the growth of markets and the needs of consumers in those markets. Sellers need to define their products well and accurately in order to expand the boundaries of their markets from local markets to regional, national and even cross-country markets. Because it is not possible for buyers to physically control these products. As the markets developed, the individual degrees and standards previously developed by the vendors were insufficient and it became necessary to regulate them. Governments have played a role in this regulation. While commercial grades and standards increase their importance in product marketing, the indicator of quality in the eyes of the consumer is rather the brand it carries.

The Benefit of Product Standards

Ratings and standards increase the exchange of information in product markets. With government support, degrees and standards reduce shipping risk, expand market boundaries, and increase economic and productive efficiency. Grading eliminates the need to physically control the product and makes price comparison possible. The needs of the consumers are communicated to the producers with the price mechanism, and the producers can develop their production and sales programs in the desired direction. The economic advantages of degrees and standards are not limited to this. Rating increases demand, which means increased sales (at a certain price or higher). Increasing production and price efficiency means decreasing marketing margins. In a competitive environment, this situation provides benefits for consumers and producers, while consumer incomes increase, prices in the retail market decrease.

Hedonic Prices

Goods are priced according to their utility. This is the hypothesis on which hedonic pricing is based (Rosen and Gubler, 1974). Accordingly, the price of a product is a function of the amount of factors it depends on and the value given by the consumer to each factor. The factors that are important and necessary for the consumer in hedonic prices are the factors used in grades and standards. In order to use the hedonic price model in price determination of agricultural products, it is necessary to determine the factors that are important in the development of grades and standards, and the degree of importance of each factor. The regression model is used in this determination:

$$P = B = B \, Z \, \partial \, B \, Z = B \, Z = e$$

In the equation, P shows the product price, Z's quality factors, B's the weight of each quality factor (to be determined as a result of the model), and in e the effect of unexplained (not included in the model) factors (error term). The quality factors included in the regression are those that are important to consumers and used in the rating. For example, the variables used in the hedonic price model for brewer's yeast are protein percentage and swelling percentage (Wilson, 1984). When the regression model is estimated, the coefficients (B's) will give the marginal prices of these factors or the elasticity of the product price relative to these factors. According to the results of the economic research, a 1% increase in the amount of protein in wheat leads to an increase of 0.5% in the price of wheat in the world markets. White wheat receives a premium of $16 per ton (Veeman, 1987). Estimating the impact of some quality characteristics on price can yield very useful results. Producers can change their mode of production, make a difference in the use of inputs, change their varieties, thus creating the opportunity to benefit from price premiums. Some quality traits can increase variety development research.

Effect of Government Supports

It is not common for the prices of agricultural products to remain unaffected for a long time; on the contrary, governments often feel compelled to intervene in the prices of agricultural products. The characteristics of the prices of agricultural products, which we mentioned earlier, necessitate the intervention of governments. Because the prices of agricultural products are very volatile, governments in developing countries want to take measures to ensure price stability in order to guarantee agricultural product production and prevent farmer incomes from falling excessively. In this section we will focus on some of these measures. Government intervention in the prices of agricultural products is based on (i) increasing the average price and income level of farmers; (ii) avoid price and income fluctuations; (iii) ensuring self-sufficiency in foodstuffs and clothing; (iv) increase efficiency in resource allocation (Padberg et al, 1997). Among the measures to be announced are price supports through government purchases, production restrictions, customs, consumption or export subsidies and difference payments. Governments sometimes have to prevent excessive increases in product prices. The excessive increase in the prices of agricultural products occurs during the years of war and famine.

The most common policies implemented are price controls or export restrictions. When conditions begin to improve, governments put an end to these policies and offer the products kept in stocks to the market.

Support purchases

Due to the favorable climatic conditions, the prices of agricultural products in the market are very low in years when agricultural products are very high. Governments make subsidy purchases to increase product prices for storable products (such as grains and cotton). Suppose the government supports the price of the product at the Pd level. This price is above the equilibrium price (Pe) that will occur under normal supply and demand conditions. To ensure that the product is sold at this price, the government must purchase and store the surplus product (Qa-Qd) on the market.

The cost of price support programs to the government depends on the elasticity of the supply and demand curves. The greater the elasticity of the supply and demand curves, the greater the cost of price support to the government. For this reason, governments try to prevent the production of some products from exceeding certain amounts in order to reduce this cost. The cost of support programs to the government also depends on the storage period of the product and the prices during the resale period. The cost of support programs can be very high for these two reasons.

Production limitation

The cost of support purchases can become enormous upon the expansion of land devoted to these crops. In such a case, it may be less costly to limit production or even to pay farmers to stop producing. In this way, support purchase costs and storage costs will not be incurred. Similar policies are implemented in the USA and England, restrictions are imposed on production, and producers are penalized if they exceed this quota. Another widely practiced application is input to limit its use. Restrictions have been imposed on tobacco, hazelnut and tea fields in Turkey. There are restrictions on dairy and meat products in the USA and Europe. In the USA, income is paid to the land left vacant by the farmer to limit wheat production (this program is called set-aside.) This program is easier to implement and control than others. However, in order to reduce production, a large amount of land must be excluded from production. Because the farmers prefer to make production by excluding the unproductive land from production and using more inputs on the more productive land. For crops whose demand is relatively inelastic, farmers can profit from limiting production.

In the short run, the demand for many agricultural products is inelastic. On the other hand, high product prices in the long run lead to the emergence of substitute products or to the supply of products from other sources. For example, as a result of the restrictions on cotton production in the USA, prices have risen a lot and cotton producers lost their markets to synthetic fabrics.

Customs and import restrictions

Various countries have tried to keep domestic prices higher than those in world markets by using quotas and customs. As a result of such protectionist policies, domestic prices remained above world prices, production increased, and the amount of imported products decreased. The extent to which domestic consumption and production are affected by conservation policies depends on the slope of the supply and demand curves.

Consumption or export supports

If governments support domestic consumption and exports, there will be no excess supply problem even if the prices are above the equilibrium price in the free market. It is normal for manufacturers to support these programs. Such a program that increases demand will be preferred to a program that limits production. Such programs are also widely supported by the non-agricultural sectors (nutrition programs in primary schools, food aid to the poor and needy).

The effects of these programs on agricultural producers are generally uneven and limited. Those who grow products with higher income elasticity (meat, cheese, convenience foods, some fruits and vegetables) will benefit from this business. Wheat, paddy and dry bean producers will earn very little. As consumers' demands for marketing services increase, marketing firms will gain from it. The USA and the EC implement these programs to prevent production surpluses in agriculture. It is normal for these programs to be found unfair by the exporting countries. The reason for this is that the export opportunities of the countries where the export of agricultural products have an important place are negatively affected (Padberg et al, 1997).

Difference payments

In difference payments, if the price in the market is less than the price guaranteed by the state, the state is obliged to pay the difference to the farmers. These payments are called compensatory payments (deficiency payment in English). Before entering the EC, England was supporting the prices of agricultural products with such a program. Compared to price support schemes, consumers benefit from reduced

prices as a result of increased production thanks to differential payments made by the government to farmers. In this way, storage problems are also eliminated. However, if these programs occupy a very important place in government expenditures, the burden on the budget may be too great. Such practices tend to increase inflation. become more widespread, governments are more likely to lose their political support. In this respect, difference payment applications will only be limited to certain products.

Price Controls

To prevent the price of a product or a group of products (such as baked goods) from rising to a level that is not politically acceptable, governments set the maximum level at which prices will rise. Sometimes the maximum price is the price on a certain date (for example, the price of bread is no more than the price on May 20, 2002). Price controls are applied to avoid shortages of strategic products in times of high inflation or war. The price is kept at the maximum level, but the demand continues to increase.

CONCLUSION

What could be the consequence of not allowing prices to rise?

In cases where the prices formed in the market will be intervened, other means will be needed to perform the functions of the price. In such cases, governments can ration the sale of products. Each family is given a report card as needed. Scorecard emerges as a new shopping tool with limited quantity. If the ration card is not applied, first comers will receive the product. In this case, the "tails" will assume the role of the price. Another consequence is the emergence of the black market.

The prices of basic agricultural products and food, which have increased significantly in the last few months, raise many questions. These questions can be listed as the reasons for price increases, the effects of climate change and drought, the extent to which the demand for biofuels is reflected in the world, how the developments in the markets of developing countries are reflected, what the future developments may be, the effects of these developments on the consumer and the new policy needs. The answers to these questions will also enable to understand the reasons for the price increases in agricultural and food products experienced in the same period in Turkey and to reveal or at least predict the differences between the price change trends in the world and the domestic trends. In this context, the discussions around the world regarding the price fluctuation, the rapidly increasing food demand of developing countries, the increase in

the demand for agricultural products, especially biofuel production as an alternative to human consumption, the restrictions imposed on exports by net exporting countries to meet their domestic demands, as well as the recent increase in oil prices. It focuses on issues such as the rapid increase experienced. 4. The recent high course of oil prices is thought to have had an impact on the fluctuations in agricultural markets, both in terms of supply and demand. As a matter of fact, it is thought that the increase in oil prices, in addition to affecting the production costs, also increases the demand for biofuels and causes fluctuations in the biofuel raw material agricultural products markets.

In the last two years, the fluctuations and high increases in the prices of agricultural and food products have become one of the priority issues especially in underdeveloped and developing countries, and developments up to social unrest have forced some countries to take serious measures to limit the increase in food prices. Most of these measures have been trade-restrictive.

• Several factors played a role in the periodic rise in the prices of agricultural and food products, and for the first time, apart from the global crisis periods, price increases were experienced in all basic agricultural products at different rates but in the same period. While the Food and Agriculture Organization (FAO) food price index increased by around 9 percent in 2006, the increase reached the level of 23 percent in 2007 compared to the previous year. According to the 2006/2007 period averages, the price increases in basic products are respectively; 80 percent in milk, 50 percent in oils (65 percent in sunflower seeds), 26 percent in rice, 50 percent in wheat, 34 percent in corn and 42 percent in cereals.

• Basically, there are many reasons for the increase in food prices. These are, briefly, the problems experienced in product supply due to global warming and the drought it brings, the negative effects of the increase in oil prices on cost elements such as production inputs and transportation, the demand for non-food products in the world markets created by some large agricultural surplus exporting countries due to the support of biofuels production, The increase in welfare caused by rapid growth in countries with developing markets and the increase in demand for meat and milk and therefore the increase in the demand for fodder crops, the speculative effects created by the capital entering the commodity exchanges in the financial markets and the practices of restrictive measures on trade by exporting countries can be counted.

• On the other hand, since the Kyoto Protocol emphasized the need to switch to alternative energy

sources instead of fossil fuels by reducing the greenhouse effect gases in response to the threat of global warming, policies encouraging biofuels began to be adopted in many agricultural surplus countries. However, since the US policies to support the use of biofuels through bioethanol production from corn coincided with a decrease in global product stocks, this situation emerged as the main reason for the increase in agricultural product prices.

• The possibility of price increases in products whose stocks are decreasing and which may experience problems in production is high in the upcoming period. In addition, considering oil prices, the increasing demand for biofuels will be an important factor for price changes in the agricultural sector in the coming period. In short, if the factors causing the price increase do not change, it is expected that the prices of agricultural and food products will increase in real terms in the long run. The impoverishing effects of this increase in food prices constitute another major problem worldwide.

• If food prices increase gradually and this increase becomes continuous, it is thought that the access to food of people living in developed countries that can keep their populations under control will not be affected much, and that the main threat is to developing and underdeveloped countries, which constitute approximately 85% of the world's population.

• The recent price fluctuations in agricultural prices in our country are parallel to the fluctuations in the world markets. The main element of this parallel development is the demand-side price pressure on agricultural products, which is also valid for world markets. However, although the supply-demand balances in products do not fully comply with the developments in the world, it is thought that the similarity of the fluctuations in product prices to the world course may be caused by the defective structures in the marketing chain of the products.

• Based on the 9.2 percent food inflation in the first four months of 2008, the total contribution of food prices to 2008 inflation is 54.6 percent.

• The recent price effects on basic products, caused by the large increases in world food prices combined with the drought experienced in our country in 2007, are expected to increase the income of agricultural producers in 2008, at best, and have created an erosion in consumer income.

• In order to reduce the negative effects of price fluctuations in the world markets in the coming period, the stock management to be carried out by TMO in basic grain products during the year will prevent speculative movements and product yield amounts and total domestic demand will be increased.

Conflict of Interest

The authors declared no conflict of interest.

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